

REMARKS:

Status of Claims

Claims 1-13 were previously pending with claims 1 and 10 being independent. Applicant has amended claims 1, 2, and 5-7, cancelled claims 8-13 without prejudice or disclaimer, and added claims 14-18. Thus, claims 1-7 and 14-18 are currently pending with claims 1 and 14 being independent.

Office Action

In the Office Action of October 27, 2006, the Examiner rejected claims 1-5, 8, and 10 under 35 U.S.C. § 102(b) as being anticipated by Tamai et al (U.S. Patent No. 5,949,178). The Examiner also rejected claims 1-5, 7-11, and 13 under 35 U.S.C. § 102(b) as being anticipated by Luthier et al (U.S. Patent No. 5,418,417). The Examiner further rejected claims 1-6, 8, 10, and 12 under 35 U.S.C. § 102(b) as being anticipated by Tsukimoto et al (U.S. Patent No. 5,917,270). Applicant respectfully submits that none of the prior art of record teaches or suggests all of the features of independent claims 1 and 14.

Amendments to the Claims and New Claims

Applicant has amended claim 1 to recite a driver component that includes “a plurality of first projections” and a friction liner that includes a “dense array of second projections,” such that *at least one of the first projections contacts more than one second projection*. Support for this newly added language can be found in the specification on page 4, lines 16-18, which discusses that the stator 14 has “a plurality of projecting teeth 22,” which are the claimed first projections. Amended Figures 1 and 2 illustrate that the first projections are oriented towards the second projections 24 of the

friction liner. As discussed at page 5, lines 24-26, one first projection contacts more than one second projection. The advantage to this structure arises as a first projection 22 of the stator 14 completes its elliptical path of travel (due to piezoelectric action). The second projections 24 of the liner 10 react against the first projection 22 as they unbend and decompress to thereby transfer energy to the rotor 16 in the form of momentum and torque (discussed on page 6, lines 22-34). Thus, the first projections amplify the tangential portion of the elliptical motion of the driver component/stator.

More particularly, in prior art applications, such as in Tamai, the projections work against a generally flat surface. As can be appreciated, each projection has a vertical and horizontal component of elliptical motion. The spaces between each projection allow for horizontal or tangential movement. When the projections are moving horizontally against the flat surface of Tamai, the projections slip. To prevent this slippage, the present invention uses a second set of projections against which the first set of projections acts. Thus, in addition to amplifying the tangential portion of the elliptical motion, the dense array of second projections prevents slippage.

New independent claim 14 recites that the liner includes a dense array of second projections, wherein the dense array includes a plurality of rows with each row oriented generally perpendicular to an outer circumference of the liner and further including a plurality of projections. (See amended Figure 2 for support for this element). None of the prior art references of record teach or suggest a dense array of second projections in the claimed row structure. Instead, at most the prior art teaches one circumferential row of projections.

New dependent claims 17 and 18 recite that during each contact event, or cycle of the energy wave, of each first projection, each first projection contacts approximately the same number of second projections so as to avoid a variable torque output, as discussed at page 5, lines 26-29.

Claim 5 has been amended to recite that the second projections 24 compress as well as bend in response to the wave in the driver component, as discussed at page 6, lines 24-26.

Discussion of the Prior Art of Record

None of the prior art of record teaches or suggests a stator with a plurality of first projections and a friction liner with a plurality of second projections, such that at least one first projection contacts more than one second projection. Tamai discloses a stator/piezoelectric element combination 2,3 in contact with a friction liner 4 having a plurality of projections 4a that in turn contacts a rotor 5. However, the stator/piezoelectric element combination 2,3 does *not* include projections of any type that can align with the liner projections 4a. Tamai does not disclose any other embodiment that includes two sets of projections.

Luthier discloses a stator/piezoelectric element combination S1,10 in contact with a plurality of projections 38 embedded in a disc D1 of a rotor R1. Alternatively, Luthier discloses the stator/piezoelectric element combination S1,10 in contact with a friction liner/rotor combination 52, R1, wherein the friction liner 52 has a plurality of projections 50. However, the stator/piezoelectric element combination S1,10 does *not* include projections of any type that can align with either the embedded projections 38 or the liner projections 50. Additionally, Luthier does not disclose any other embodiment that includes two sets of projections.

Tsukimoto discloses a stator 1 with piezoelectric elements that may include projections 1b. Tsukimoto also discloses a rotor 2 that may include projections 21A (See Fig. 19A). However, as illustrated in Figs. 1, 3, 19A, and 19B, each stator projection 1b interacts with the rotor projections 21A one at a time, i.e., the projections of the rotor and stator have a one-to-one contact. Thus, Tsukimoto does not disclose that the projections on the stator can contact more than one of the projections of the rotor 20, as presently claimed in independent claim 1 and dependent claim 16. Therefore, because at least one projection contacts more than one second projection at any given instant, this results in an increased release of energy along the horizontal or tangential elliptical motion of the first projections.

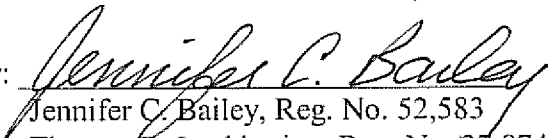
Finally, none of the prior art references of record teaches or suggests a liner that includes a dense array of second projections, wherein the dense array includes a plurality of rows with each row oriented generally perpendicular to an outer circumference of the liner and further including a plurality of projections, as recited in claim 14.

Applicant respectfully submits that independent claims 1 and 14 and all claims that depend from these claims are neither anticipated nor rendered obvious by the prior art of record. In view of the remarks herein, applicant respectfully submits that claims 1-7 and 14-18 are now in allowable condition and requests a Notice of Allowance. In the event of further questions, the Examiner is urged to call the undersigned. Any additional fee which is due in connection with this amendment should be applied against our Deposit Account No. 19-0522.

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Respectfully Submitted,

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